

## LESSON

## 8-8

**Practice C****Solving Radical Equations and Inequalities****Solve each equation.**

1.  $\sqrt[3]{4x+1} - 5 = 0$

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2.  $3\sqrt{x-11} = 18$

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3.  $\sqrt[4]{10x+11} = 3$

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4.  $\sqrt[3]{3x} = \sqrt[3]{2x+9}$

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5.  $x + 2 = \sqrt{3x+6}$

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6.  $(10x - 25)^{\frac{1}{2}} = x$

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7.  $5(6x+1)^{\frac{1}{4}} = 10$

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8.  $4(7x+18)^{\frac{1}{2}} = 4x$

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**Solve each inequality.**

9.  $\sqrt{4x+5} \leq 3$

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10.  $\sqrt[3]{x+3} \geq 2$

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11.  $\sqrt{x-7} + 9 < 12$

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12.  $\sqrt[3]{x-6} + 7 > 4$

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13.  $\sqrt{3x-1} > \sqrt{x+7}$

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14.  $\sqrt[3]{x+2} - 1 \leq 4$

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**Solve.**

15. Einstein's theory of relativity states that the mass of an object increases as the object's velocity increases. The mass,  $m(v)$ , of an object traveling with velocity,  $v$ , is given by  $m(v) = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$ , where  $c$  is the speed of light

and  $m_0$  is the mass of the object at rest. In terms of  $c$ , solve for the velocity at which the effective mass,  $m(v)$ , of the particle has increased to twice its mass at rest,  $m_0$ .

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**Practice B**

- $x = 43$
- $x = 20$
- $x = 6$
- $x = \frac{1}{2}$
- $x = -15$
- $x = \frac{1}{4}$
- No solutions, since both  $-1$  and  $-7$  are extraneous
- $x = 32$
- $x = 7$
- $x = -52$
- $-2 \leq x \leq 1$
- $x > 40$
- $\frac{1}{2} \leq x \leq 8$
- $x > 44$
- 25 years

**Practice C**

- $x = 31$
- $x = 47$
- $x = 7$
- $x = 9$
- $x = -2$  and  $x = 1$
- $x = 5$
- $x = \frac{5}{2}$
- $x = 9$ ;  $x = -2$  is an extraneous solution.
- $-\frac{5}{4} \leq x \leq 1$
- $x \geq 5$
- $7 \leq x \leq 16$
- $x > -21$
- $x > 4$
- $-2 \leq x \leq 123$
- $v = \frac{\sqrt{3}}{2}c$

**Reteach**

- $2x + 11 = 27$   
 $2x = 16$ ;  $x = 8$   
 $4\sqrt[3]{2(8) + 11} = 12$   
 $4\sqrt[3]{36} = 12 \checkmark$
- $\sqrt{x - 3} = 4$   
 $x - 3 = 16$   
 $x = 19$   
 $5 + \sqrt{19 - 3} = 5$   
 $5 + \sqrt{16} = 5 + 4$   
 $= 9 \checkmark$

$$3. \sqrt{x + 4} = 5$$

$$x + 4 = 25$$

$$x = 21$$

$$2\sqrt{21 + 4} =$$

$$2\sqrt{25} = 2 \cdot 5$$

$$= 10 \checkmark$$

$$4. 5x + 6 = 81$$

$$5x = 75$$

$$x = 15$$

$$5. \left[ (6x - 8)^{\frac{1}{3}} \right]^3 = 4^3$$

$$6x - 8 = 64$$

$$6x = 72$$

$$x = 12$$

$$6. x^2 = \left[ (x + 6)^{\frac{1}{2}} \right]^2$$

$$x^2 = x + 6$$

$$x^2 - x - 6 = 0$$

$$(x - 3)(x + 2) = 0$$

$$x = 3$$

**Challenge**

- 15.25
- 9
- No solution
- 19
- 5
- 3
- 5 or  $-\frac{1}{9}$
- 8 or  $-1$
- 7
- 6

**Problem Solving**

- Directly
- $d = \frac{s^2}{30f}$
  - About 58 ft
  - No; possible answer: his skid marks were only 52 ft, not 58 ft.
  - About 33 mi/h
- About 9 ft
  - By at least 15 ft
- B
- A